PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ACM 3027 P1-WO	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/EP2004/014017	International filing date *(day/month/year)* 08.12.2004	Priority date *(day/month/year)* 12.12.2003
International Patent Classification (IPC) or national classification and IPC C22B1/24, C22B1/243, C22B1/244		
Applicant AKZO NOBEL N.V. et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 1 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
11.10.2005	13.01.2006
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Bombeke, M Telephone No. +31 70 340-3576

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/014017

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ~~☐ This report is based on translations from the original language into the following language ,~~ which is the language of a translation furnished for the purposes of:

   ☐ international search (under Rules 12.3 and 23.1(b))
   ☐ publication of the international application (under Rule 12.4)
   ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

   Description, Pages

   1-12 as originally filed

   Claims, Numbers

   1-5 filed with the demand

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

   ☐ the description, pages
   ☐ the claims, Nos.
   ☐ the drawings, sheets/figs
   ☐ the sequence listing *(specify)*:
   ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

   ☐ the description, pages
   ☐ the claims, Nos.
   ☐ the drawings, sheets/figs
   ☐ the sequence listing *(specify)*:
   ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/014017

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-4
	No:	Claims	5
Inventive step (IS)	Yes:	Claims	3
	No:	Claims	1,2,4,5
Industrial applicability (IA)	Yes:	Claims	1-5
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (SEPARATE SHEET)

International application No.
PCT/EP2004/014017

Re Item V.

1 Reference is made to the following documents:

D1 : US 4 552 202 A (BUGG ET AL) 12 November 1985 (1985-11-12)
D2 : DATABASE WPI Section Ch, Week 198628
Derwent Publications Ltd., London, GB; Class A97, AN 1986-182161
XP002320676 &; SU 1 198 128 A (KHERSON IND INST) 15 December 1985 (1985-12-15)
D3 : DATABASE WPI Section Ch, Week 197943
Derwent Publications Ltd., London, GB; Class A11, AN 1979-77864B
XP002320677 &; JP 54 117313 A (NIPPON NICKEL CO LTD) 12 September 1979 (1979-09-12)
D4 : US 4 948 430 A (BANYAI ET AL) 14 August 1990 (1990-08-14)
D5 : US 4 288 245 A (ROORDA ET AL) 8 September 1981 (1981-09-08)
D6 : EP 0 297 553 A (AQUALON COMPANY) 4 January 1989 (1989-01-04)
D7: US 6 293 994 A (FIELD ET AL) 25 September 2001 (2001-09-25)

2 INDEPENDENT CLAIM 5

2.1 A composition of matter used or useful as a binder system and comprising sodium silicate and carboxymethyl cellulose is disclosed in D1 (and also in Derwent Abstr. JP-A-54117321 mentioned as 1st citation in the ISR).

Hence the present application does not meet the criteria of Article 33(1) PCT, because the subject matter of claim 5 is not new in the sense of Article 33(3)PCT and does not involve an inventive step (Art. 33(3) PCT) either.

In this connection the disclaimer introduced in claim 1 cannot be considered capable of restoring novelty resp. affording inventiveness, because claim 5 is directed to a composition of matter known "per se" (arbitrary mixture) and, moreover, the scope of said claim is open-ended given the use of the expression "**comprising**".

3 INDEPENDENT CLAIM 1 : NOVELTY

3.0 Claim 1 is novel in the sense of Art. 33(2) PCT, since the combination of process features defined therein is not disclosed in any single one of documents D1-D7. Claims 2-4 depending from claim 1 thus also fulfill the novelty criterion.

3.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject matter of claim 1 does not involve an inventive step in the sense of Article 33(3)PCT.

3.3.1 Documents D2 and D3, which are considered to represent the most relevant state of the art to the subject matter of claim 1, disclose the agglomeration, in particular pelletisation of iron ore (D2), of oxide material in the presence of a binder system comprising carboxymethylcellulose and a minor quantity of earth alkali metal salt (CaCl2 in D2) or alkali metal salt (NaCl, Na2SO4 in D3) in an amount lower than 0.08%.

3.3.2 The subject-matter of independent claim 1 differs from the disclosure of D2 or D3 in that alkali metal "silicate" is used in the binder system.

3.3.3 In view of D1 and D4-D7 the solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons: D4-D6 (see tables) show that the amount of inorganic salt additives used in conjunction with a cellulose binder of the type used in the present application invariably amounts to about 0.04 %. In the light of D1 and the above cited JP-citation (and also D7) a sodium silicate is to be regarded as a common ingredient or additive of cellulose type binders which is apparently useful as a cheap inorganic binder equivalent, according to circumstances, of the salt additions of D2-D6. Moreover, sodium silicates incl. commercial water glass are generally known as suitable inorganic binders and applied in numerous binder systems (see e.g. D7) additives for any agglomeration purpose, irrespective of the type of ore materials (iron ore fines, Ni ore, Cr ore, Ti ore or ilmenite etc.) resp. the composition of the particulate pyrometallurgical residues to be agglomerated or pelletized.

3.3.4 As a consequence, all the binder features disclosed in D1 and D2/D3 would obviously be considered and combined by the skilled person, in connection with the D4-D6 teachings, for providing alternative binder formulations, according to circumstances, without thereby exercising inventive skills in the sense of Article 33(3) PCT. Furthermore, the obvious requirement of a low silica input for iron-rich pellets implies to minimize silicate binder additions. In this connection the disclosure of D7, requiring silicate contents above 0.08% but describing Na silicate amounts of 0.09%, i.e. just in excess of the claimed upper limit of 0.08%, is not deemed to teach away from the claimed invention, because the organic binder component in the exemplified case is not carboxymethyl cellulose.

3 DEPENDENT CLAIMS 2-4 : INVENTIVE STEP

3.1. Dependent claims 2,4 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Article 33(3) PCT).
Indeed, said features are also known from the above mentioned documents.

3.2. The particular content range for alkali metal silicate set forth in dependent claim 3 is considered not to be obviously derivable from the cited prior art. Moreover, a technical effect (specific improvements of pellet quality) has been demonstrated. Hence, claim 3 is determined to define inventive subject-matter in the sense of Art. 33(3) PCT.

CLAIMS

1. A process for producing iron ore agglomerates comprising agglomerating fine iron ore particles in the presence of a binder system wherein the binder system comprises a binder and an alkali metal silicate and wherein the alkali metal silicate is present in an amount of between 0.0001 to 0.08 percent by weight, based on the total weight of dry iron ore agglomerate, wherein the binder system is free of synthetic polymer.

2. The process of claim 1 wherein the binder is carboxymethyl cellulose.

3. The process of either of claims 1 and 2 wherein the amount of alkali metal silicate is between 0.04 and 0.08 percent by weight, based on the total weight of dry iron ore agglomerate.

4. The process of any one of the preceding claims wherein the alkali metal silicate is sodium silicate.

5. A binder system comprising carboxymethyl cellulose and an alkali metal silicate, with the proviso that the binder system is not an aqueous suspension comprising alkali metal silicate, carboxymethyl cellulose, and particulate impurities originating from impure silica powder used to prepare the alkali metal silicate, or a combination of 18 kg water glass, 4 kg carboxymethyl cellulose and 40 kg water.